Statement Regarding the Claims - (Note to Legal Instruments Examiner)

Because the present application is a Reissue Application, only the claims being amended herein are required to be set forth herein. A listing of claims is not required (or even deemed appropriate). See 37 CFR 1.173.

Please amend claims 1, 14 and 23 as set forth hereinbelow.

1. (Twice Amended) A method for thermally converting one or more metal halide reactants in a thermodynamically stable high temperature gaseous stream to a desired end product in the form of a gas or ultrafine solid particles, comprising [the following steps]:

introducing a metal halide reactant stream at one axial end of a reaction chamber;

introducing a reducing gas to the gaseous stream prior to or at the time the metal halide reaches a selected reaction temperature;

defining the reactor chamber [having] to exhibit a predetermined length sufficient to effect heating of the gaseous stream to the selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

rapidly expanding the reactant stream to rapidly cool the gaseous stream by converting thermal energy to kinetic energy as a result of adiabatic and isentropic expansion as the reaction stream expands;

adding additional reducing gas to the reactant stream after it has reacted with the initial reducing gas to minimize back reactions, thereby retaining the desired end product within the flowing gaseous stream; and

collecting the desired end product.

14. (Twice Amended) A method for thermal conversion of one or more metal halide reactants in a thermodynamically stable high temperature gaseous stream to a desired end product in the form of a gas or ultrafine solid particles, comprising [the following steps]:

introducing a stream of plasma arc gas between the electrodes of a plasma torch including at least one pair of electrodes positioned at [the] an inlet end of an axial reactor chamber, the stream of plasma arc gas being introduced at a selected plasma gas flow while the

electrodes are subjected to a selected plasma input power level to produce a plasma within the reactor chamber and extending toward [its] an outlet end thereof;

thoroughly mixing an incoming reactant stream into the plasma by injecting at least one metal halide reactant into the reactor chamber at or adjacent to [its] the inlet end thereof at a selected injection angle and at a selected reactant input rate to progressively effect heat transfer between the plasma and the resulting gaseous stream as it flows axially toward the outlet end of the reactor chamber;

introducing a reducing gas to the plasma arc gas stream prior to or at the time the metal halide reactant stream is added;

defining the length of the reactor chamber [being] such that it is sufficient to effect heating of the gaseous stream to a selected equilibrium temperature at which a desired end product is available as a thermodynamically unstable reaction product within the gaseous stream at a location adjacent to the outlet end of the reactor chamber;

directing the gaseous stream through a coaxial convergent-divergent nozzle positioned in the outlet end of the reactor chamber to rapidly cool the gaseous stream by converting thermal energy to kinetic energy as a result of adiabatic and isentropic expansion as it flows axially through the nozzle, the nozzle having a converging section and a diverging section respectively leading to and from a restrictive open throat;

adding additional reducing gas to the reactant stream immediately prior to the throat of the nozzle, at the throat of the nozzle or immediately after the throat of the nozzle to minimize back reactions and retain the desired end product in the flowing gaseous stream;

cooling the gaseous stream exiting the nozzle by reducing its velocity while removing heat energy at a rate sufficient to prevent increases in its kinetic temperature; and

separating desired end products from the gases remaining in the cooled gaseous stream.

23. (Twice Amended) A method for thermally converting one or more reactants in a thermodynamically stable high temperature gaseous stream to a desired end product in the form of a gas or ultrafine solid particles, comprising [the following steps]:

introducing a reactant stream at one axial end of a reaction chamber;

defining the reactor chamber [having] to exhibit a predetermined length sufficient to effect heating of the gaseous stream to a selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

passing the gaseous stream through a virtual convergent-divergent nozzle formed by directing one or more streams of particles, droplets, liquid or gas into the main flow stream of the reaction chamber to cause the main gaseous stream to flow as if a real convergent-divergent nozzle were present, to rapidly cool the gaseous stream by converting thermal energy to kinetic energy as a result of adiabatic and isentropic expansion as the reaction stream expands; and

collecting the desired end product.